

§ 1065.630

from zero to CITT, set the reference torque to CITT. This is to provide smoother torque references below idle speed.

(vi) For motoring points, make no changes.

(vii) For consecutive points with reference torques from zero to CITT that immediately follow idle points, change their reference torques to CITT. This is to provide smooth torque transition out of idle operation. This does not apply if the Neutral-When-Stationary feature is used and the transmission has shifted to neutral.

(viii) For consecutive points with reference torque from zero to CITT that immediately precede idle points, change their reference torques to CITT. This is to provide smooth torque transition into idle operation.

(4) *Permissible deviations for any engine.* If your engine does not operate below a certain minimum torque under normal in-use conditions, you may use a declared minimum torque as the reference value instead of any value denormalized to be less than the declared value. For example, if your engine is connected to a hydrostatic transmission and it has a minimum torque even when all the driven hydraulic actuators and motors are stationary and the engine is at idle, then you may use this declared minimum torque as a reference torque value instead of any reference torque value generated under paragraph (d)(1) or (2) of this section that is between zero and this declared minimum torque.

(e) *Generating reference power values from normalized duty cycle powers.* Transform normalized power values to reference speed and power values using your map of maximum power versus speed.

(1) First transform normalized speed values into reference speed values. For a given speed point, multiply the corresponding % power by the mapped power at maximum test speed, f_{mtest} , unless specified otherwise by the standard-setting part. The result is the reference power for each speed point, P_{ref} . Convert these reference powers to corresponding torques for operator demand and dynamometer control and for duty cycle validation per 1065.514. Use the reference speed associated with each reference power point for this conversion. As with cycles specified with % torque, linearly interpolate between these reference torque values generated from cycles with % power.

(2) *Permissible deviations for any engine.* If your engine does not operate below a certain power under normal in-use conditions, you may use a declared minimum power as the reference value instead of any value denormalized to be less than the declared value. For example, if your engine is directly connected to a propeller, it may have a minimum power called idle power. In this case, you may use this declared minimum power as a reference power value instead of any reference power value generated per paragraph

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(e)(1) of this section that is from zero to this declared minimum power.

§ 1065.630 1980 international gravity formula.

The acceleration of Earth's gravity, a_g , varies depending on your location. Calculate a_g at your latitude, as follows:

$$\begin{aligned} a_g = & 9.7803267715 \cdot [1 + s \\ & 5.2790414 \cdot 10^{-3} \cdot \sin^2(\theta) + \\ & 2.32718 \cdot 10^{-5} \cdot \sin^4(\theta) + \\ & 1.262 \cdot 10^{-7} \cdot \sin^6(\theta) + \\ & 7 \cdot 10^{-10} \cdot \sin^8(\theta)] \quad \text{Eq. 1065.630-1} \end{aligned}$$

Where:

θ = Degrees north or south latitude.

Example:

$\theta = 45^\circ$

$$\begin{aligned} a_g = & 9.7803267715 \cdot (1 + \\ & 5.2790414 \cdot 10^{-3} \cdot \sin^2(45) + \\ & 2.32718 \cdot 10^{-5} \cdot \sin^4(45) + \\ & 1.262 \cdot 10^{-7} \cdot \sin^6(45) + \\ & 7 \cdot 10^{-10} \cdot \sin^8(45)) \\ a_g = & 9.8178291229 \text{ m/s}^2 \end{aligned}$$

§ 1065.640 Flow meter calibration calculations.

This section describes the calculations for calibrating various flow meters. After you calibrate a flow meter using these calculations, use the calculations described in § 1065.642 to calculate flow during an emission test. Paragraph (a) of this section first describes how to convert reference flow meter outputs for use in the calibration equations, which are presented on a molar basis. The remaining paragraphs describe the calibration calculations that are specific to certain types of flow meters.

(a) *Reference meter conversions.* The calibration equations in this section use molar flow rate, \dot{n}_{ref} , as a reference quantity. If your reference meter outputs a flow rate in a different quantity, such as standard volume rate, V_{stdref} , actual volume rate, V_{actref} , or mass rate, \dot{m}_{ref} , convert your reference meter output to a molar flow rate using the following equations, noting that while values for volume rate, mass rate, pressure, temperature, and molar mass may change during an emission test,